NEVADA DIVISION OF ENVIRONMENTAL PROTECTION

FACT SHEET
(Pursuant to NAC 445A.236)
January 2004

PERMITTEE NAME: Kerr-McGee Chemical, LLC

MAILING ADDRESS: Post Office Box 55
Henderson, Nevada 89009

PERMIT NUMBER: NV0023060 – Major Modification

DISCHARGE LOCATION: Kerr-McGee Chemical LLC, Henderson Facility
8000 West Lake Mead Drive
Henderson, Clark County, Nevada 89015

Latitude: 36° 02' 35.4" North
Longitude: -114° 59' 58.7" West

Township 22 South, Range 62 East, Section 12 MDB&M

FLOW: Outfall 001: Treated Groundwater Discharge to the Las Vegas Wash upstream of Telephone Line Road

Latitude: 36° 5' 15" North
Longitude: -114° 59' 30" West

Flow Rate: 1.45 Million Gallons per Day as a 30-day average
1.75 Million Gallons per Day as a daily maximum

GENERAL:

Kerr-McGee Chemical, LLC (Kerr-McGee) currently holds National Pollutant Discharge Elimination System (NPDES) Permit NV0023060 to discharge water treated through either an ion-exchange system or a biological treatment system to remove perchlorate from extracted groundwater. Since the permit was issued on August 7, 2000, groundwater has been treated using two ion exchange systems while a fluidized-bed reactor (FBR) biological treatment system was under design and construction.

The permit limits the discharge rate, and consequently the rate that either treatment system may be operated, to 1.22 million gallons per day (MGD) as a 30-day average and 1.4 MGD as a 7-day average (Outfall 001). However, design parameters for the FBR system exhaust opportunities to improve environmental return on accelerated remediation of groundwater containing perchlorate. As a consequence, the FBR system has a projected design flow rate of 1,000 gallons per minute (gpm), which has been approved by the Nevada Division of Environmental Protection Bureau of Water Pollution Control (Division), and subsequent operations may demonstrate sufficient treatment capability to support flow rates in excess of 1,000 gpm.

Kerr-McGee has applied for a major modification to NPDES Permit NV0023060 to increase the permitted flow rate from 1.22 and 1.4 MGD as 30-day and 7-day average flow rates, respectively to 1.45 and 1.75 MGD as 30-day average and daily maximum flow rates, respectively. The 7-day average flow rate is proposed for removal in favor of a daily maximum limitation. In order to expedite the subject remediation and facilitate maximum environmental return, it is the intent of the Division to limit this discharge as a function of treatment capability and conditional mass loading to the Las Vegas Wash rather than by flow rate. Therefore, the permitted discharge flow rates are proposed to be increased as requested, subject to Division approval of system design and adequate demonstration of treatment efficiency.

Effluent discharge limitations in the existing permit contemplated the installation and operation of a biological treatment system, and were instituted into the current permit after public comment and due process. However, the design, application, and operation of the FBR treatment system is considered an innovative application of currently available technology that has yet to be demonstrated under the matrix conditions inherent to this particular groundwater process flow. While the FBR technology is a proven treatment mechanism for perchlorate and much lower effluent discharge concentrations are anticipated, the Kerr-McGee project introduces groundwater with higher perchlorate concentrations (approximately 300 milligrams per liter [mg/L]), that also contains considerably elevated total dissolved solids concentrations (TDS, up to approximately 12,000 mg/L), compared to other FBR pilot and full scale projects.

It is generally acknowledged that analytical detection compels innovative treatment technology. However, the fact that approved laboratory methods for low level analysis of perchlorate in the presence of elevated TDS have not been definitively identified illustrates how undeveloped available technology is, with or without difficult matrix conditions, and not only in the laboratory, but more importantly for perchlorate treatment in the field. In principle and in practice, the construction and installation of this FBR system is considered unprecedented, and until system operation can be equilibrated and optimized during both warm and cold seasons, ultimate treatment performance is speculative.

Therefore, the perchlorate effluent limitation is proposed to be iteratively reduced in order to scientifically and empirically assess treatment capabilities and attainability given site-specific complexities. An interim perchlorate effluent discharge limitation of 80 micrograms per liter (μg/L) is effective 90 days after the FBR system becomes operational at a flow rate of 1,000 gpm. This interim limitation is derived based on the design flow rate of 1,000 gallons per minute (gpm) and the stipulation that the treated discharge will not contribute more than 1 pound per day of perchlorate to the Las Vegas Wash during interim operation.

This interim effluent limitation shall remain in effect for 12 months, while system function and treatment attainability are challenged and definitively quantified. The subsequent perchlorate effluent limitation is anticipated to be established at 18 μg/L, consistent with the provisional water quality guideline used by the State of Nevada and in anticipation of subsequent regulatory action. Both interim and superseding effluent limitations are considered to be 'process capability driven,' which assumes that the system and technology will demonstrate attainability at a maintainable level of performance.

If it is demonstrated that the system is unable to achieve an effluent perchlorate concentrations of 80 or 18 μg/L, an empirically derived effluent limitation, that can be expected to be optimally achieved and maintained, will be alternatively instituted. Provisions are specified with the Effluent Limitations table of Permit NV0023060 describing this available mechanism for re-assigning alternative effluent limitations in excess of specified concentrations, in which case, backsliding restrictions of the Clean Water Act (Section 402(o)) are not considered violated.

It is the intent and purpose of the Division to limit this discharge as a function of discharge concentration as opposed to flow rate for current and prospective operating scenarios. Maximum operation flow is in the best interest of the public and the environment, and upon the institution of effluent limits demonstrated to be achievable at 1,000 gpm, if the system is capable of treating higher flow rates while meeting effluent limitations, then increased flow rates may be reconsidered.

This major modification proposes limited changes, including flow and the addition of the interim perchlorate effluent limitation, and these select limitations are the only aspects of this permit subject to review and public comment[1]. While a superseding effluent limitation for perchlorate is contemplated in the provisions of this proposed permit modification, a discretionary mechanism for instituting an attainable perchlorate effluent limitation is specified in permit language.

[1] NAC 445A.263, 40 CFR Part 122.62.

DISCHARGE CHARACTERISTICS:

Perchlorate and Cr^{6+} are the compounds subject to remedial action in this project. Ancillary compounds that may be found in process water are considered credited toward effluent limitations because their contribution to discharge characteristics is "solely as a result of their presence in intake water"[2] and these constituents, or some fraction thereof, would likely otherwise drain to the wash under inherent hydrologic dynamics. Regulation of ancillary compounds, with either discrete limits or as monitor and report requirements, remain unchanged in permit conditions.

Listed effluent discharge characteristics limit: 5-day biochemical oxygen demand, perchlorate, pH, Cr^{6+}, total chromium, total suspended solids, total iron, manganese, total phosphorus, and ammonia. Characteristics such as color, total inorganic nitrogen, unionized ammonia, TDS, sulfide, oil and grease, boron, dissolved oxygen, nitrate, kjeldahl nitrogen, chloride, radium isotopes, gross alpha, and chlorate are required to be monitored and reported. A demonstration that ancillary compound concentrations present in the intake are not increased as a function of treatment is required quarterly. Since the permit was issued in August 2000, discharge characteristics have generally complied with required limitations.

The design of the FBR biological treatment system uses a two-phase series of reactors that contain sand and granular activated carbon as biological attachment media. Two sets of sand FBRs operate as primary treatment reactors while two sets of carbon FBRs provide secondary polish. Post polish process flow is aerated, clarified, and disinfected prior to discharge into the Las Vegas Wash west (upstream) of Telephone Line and Pabco Roads. Influent water is also treated with ferrous sulfate to reduce, precipitate, and remove hexavalent chromium (Cr^{6+}) before introduction into the FBR system.

RECEIVING WATER CHARACTERISTICS:

The receiving water for Outfall 001 is the Upper Las Vegas Wash defined as the wash from Telephone Line Road upstream to the confluence of discharges from City of Las Vegas and Clark County wastewater treatment plants. Water quality standards for the toxic constituents applicable to the Las Vegas Wash are contained in Nevada Administrative Codes (NAC) 445A.144 and 445A.199. Existing effluent limitations consider and protect these water quality criteria, and other than the change to the perchlorate effluent limitation, are not the subject of this modification.

PROPOSED LIMITATIONS:

The flow limitation proposed for modification is distinguished from the remaining effluent limitations to correct column headings to convey meaningful relevance and for easy reference. The only other modification reflects changes to the perchlorate effluent limitation during interim and subsequent system operation. These are the only conditions considered or affected by this permit modification, and are the only conditions subject to public comment[3].

Effluent samples taken in compliance with the monitoring requirements specified below shall be taken after treatment and prior to confluence with the receiving waters. Effluent samples are designated as **EFF**. Influent samples shall be collected at the intake of the treatment, designated as **INF**. LW6.05, LW0.55, LW5.5 (previously LVW-2, LVW-5, and LM-6) are located at designated sampling locations in the Las Vegas Wash.

The discharge shall be limited and monitored by the Permittee as specified below:

TABLE I.1

PARAMETERS	EFFLUENT DISCHARGE LIMITATIONS			MONITORING REQUIREMENTS		
	30-Day Average	Daily Maximum	30 Day Average	Sample Location(s)	Measurement Frequency	Sample Type

[2] 40 Code of Federal Regulations (CFR) Part 122.45(g) and 40 CFR 122.21(h)(4)(iv)
[3] NAC 445A.263, 40 CFR Part 122.62.

PARAMETERS	EFFLUENT DISCHARGE LIMITATIONS		lb/day	MONITORING REQUIREMENTS		
Permitted Flow	**1.45 MGD**	**1.75 MGD**	NA	EFF	Continuous	Flow meter

TABLE I.1 (CONTINUED)

PARAMETERS	EFFLUENT DISCHARGE LIMITATIONS			MONITORING REQUIREMENTS		
	30 Day Ave. mg/l	**7 Day Ave. mg/l**	**30 Day Ave. lb/day**	**Sample Location(s)**	**Measurement Frequency**	**Sample Type**
BOD_5 (inhibited)	25 mg/L	40 mg/L	254 lb/day	INF, EFF	Weekly	Discrete
Perchlorate-Ion Exchange	97%* removal	Monitor and Report	Monitor & Report	INF, EFF	Weekly	Daily discrete samples, composited weekly
	*or 3 mg/l whichever is greater					
Interim Perchlorate–Bioreactor – (12-Months)	80[1] µg/L	Monitor and Report	-----	INF, EFF	Weekly	Daily discrete samples, composited weekly
pH	between 6.5 and 9 standard units			EFF	Weekly	Discrete
Hexavalent Chromium	Monitor & Report	0.010 mg/l	Monitor & Report	INF, EFF	Weekly	Discrete
Total Chromium	Monitor & Report	0.1 mg/l	Monitor & Report	INF, EFF	Weekly	Discrete
Total Suspended Solids	135 mg/L	Monitor & Report	Monitor & Report	EFF	Weekly	Discrete
Iron, Total	10 mg/L	Monitor & Report	Monitor & Report	EFF	Weekly	Discrete
Manganese	5 mg/L	NA	Monitor and Report	EFF	Weekly	Discrete
Total Phosphorus as P	Monitor & Report	Monitor & Report	20 lb/day*	INF, EFF	Weekly	Discrete
	*If the load of Total Phosphorous in the Las Vegas Wash exceeds 434 lb/day March 1 - October 31st, the Permittee shall negotiate an Individual Waste Load Allocation or another approved mechanism which ensures the WQS will be met.			LW0.55	Twice/month	Discrete
Ammonia as N	Monitor & Report	Monitor & Report	40 lb/day*	EFF	Weekly	Discrete

PARAMETERS	EFFLUENT DISCHARGE LIMITATIONS			MONITORING REQUIREMENTS		
	30 Day Ave. mg/l	7 Day Ave. mg/l	30 Day Ave. lb/day	Sample Location(s)	Measurement Frequency	Sample Type
	*If the load of Total Ammonia in the Las Vegas Wash exceeds 970 lb/day April 1-September 30, the Permittee shall negotiate an Individual Waste Load Allocation or another approved mechanism which ensures the WQS will be met.			LW0.55	Twice/month	Discrete
Attachment A	The permittee shall demonstrate that there is no increase in the concentration or loading of the "other" constituents as a result of the discharge. The permittee shall only be responsible for utilizing results which are greater than the PQL, however, all data above the MDL shall be reported.			EFF	Quarterly	Discrete
Color	Monitor & Report			INF, EFF	Weekly	Discrete
Total Inorganic Nitrogen as N	Monitor & Report			INF, EFF	Weekly	Discrete
Un-Ionized Ammonia as N	Monitor & Report			INF, EFF	Weekly	Calculated
Total Dissolved Solids	Monitor & Report			INF, EFF	Weekly	Discrete
Sulfide	Monitor & Report			INF, EFF	Weekly	Discrete
Oil and Grease	Monitor & Report			INF, EFF	Weekly	Discrete
Boron	Monitor & Report			EFF	Weekly	Discrete
Dissolved Oxygen	Monitor & Report			EFF	Weekly	Discrete
Nitrate as N	Monitor & Report			EFF	Weekly	Discrete
Kjeldahl Nitrogen as N	Monitor & Report			INF, EFF	Weekly	Discrete
Chloride	Monitor & Report			INF, EFF	Weekly	Discrete
Radium 226 + 228	Monitor & Report			EFF	Weekly	Discrete
Gross Alpha	Monitor & Report			EFF	Weekly	Discrete
Chlorate (ClO3)	Monitor & Report			INF, EFF	Weekly	Discrete
Acute WET	See permit condition I.A.15.			EFF	Monthly	Discrete

[1] Assigned effluent limitations are 'process capability driven', and assume attainability in the absence of definitive demonstration. If it is demonstrated that the Fluidized Bed Biological Reactor system is unable to achieve and/or maintain the assigned perchlorate limitations, an alternative, and potentially higher, effluent limitation may be substituted at the discretion of the Nevada Division of Environmental Protection. The prerogative to institute an alternative, potentially higher perchlorate effluent limitation is reserved as a condition of this permit, in which case, backsliding provisions of Section 402(o) of the Clean Water Act are not violated. The 12-month interim period begins 90 days after the system begins operation at the design-specified flow rate of 1,000 gallons per minute (gpm).

MGD: Million gallons per day
as N: As nitrogen
as P: As phosphorus

SU: Standard units
mg/L: Milligrams per liter
μg/L: Micrograms per liter
lb/day: Pounds per day

Conditions:

1. After the interim 12-month operation period defined under Part I.A.1 Table I.1, the superseding perchlorate effluent limitation is planned to be reduced to a value of 18 μg/L, consistent with the provisional perchlorate water quality guideline used by the State of Nevada, and in consideration of anticipated regulatory action. However, the exact limitation will be based on demonstrated process capability, consistent treatment attainability, and the availability of analytical technology to detect and accurately quantify low perchlorate concentrations despite prominent matrix interferences.

2. Perchlorate is considered a toxic pollutant and the application of perchlorate effluent discharge limitations is therefore regulated under Nevada Administrative Code (NAC) 445A.144. Laboratory methods acceptable to illustrate compliance with the designated effluent limitations shall be either: (1) approved per 40 Code of Federal Regulations (CFR) Part 136, (2) an alternative, standard analytical test procedure approved by the Environmental Protection Agency, and/or (3) an equivalent method approved by the Nevada Division of Environmental Protection. EPA Method 314.0 shall be used to determine compliance with effluent limitations until otherwise specified by the Nevada Division of Environmental Protection.

3. The Fluidized Bed Reactor biological treatment shall achieve and maintain a treatment efficiency of 99% or greater.

Rationale:

Flow:
This modification changes the flow rate so that the operation of the remedial treatment system is primarily limited by the characteristic profile of the discharge and appropriate protections to the Wash instead of flow. The revision of this parameter limitation simply authorizes proactive operation of the FBR system to yield maximum remedial effect and optimal return on mechanical investment. The 1.45 MGD permitted flow rate as a 30-day average represents the daily volume of 1000 gpm rounded up, and 1.75 MGD as the daily maximum represents an additional 20% margin for operating fluctuation. Perchlorate treatment efficiency and authorized mass flux limitations to the wash remain unchanged and must be observed during start-up and the transition full scale operation until more aggressive effluent limitations can be derived.

Perchlorate:
The interim discharge limitation equates to a maximum perchlorate mass discharge of one (1) pound per day while treatment capability is under evaluation. Based on a design flow rate of 1,000 gpm, the interim effluent limitation of 80 μg/L (parts per billion) is assigned, reflecting the tangible expectation that the fluidized bed biological reactor will yield perchlorate discharge concentrations much lower than those achieved with the ion exchange systems, and much lower than those initially contemplated during permit development.

However, the perchlorate treatment objective of the FBR remains aggressive, and in theory, a treatment efficiency at or near 100% is the ultimate expectation. Therefore, a progressive effluent limitation of 18 μg/L is planned to be instituted after 12 months of interim system operation (while 80 μg/L is the applicable perchlorate discharge limitation), unless Kerr McGee demonstrates that this projected effluent limitation is not reasonably achievable or maintainable with the FBR biological treatment system. Should such a demonstration justify alternative and potentially higher perchlorate effluent limitations, the Division reserves the authority and prerogative to establish the effluent limitations accordingly.

Other Effluent Limitations:
Other effluent discharge limitations are not proposed for modification at this time, with the understanding that effluent limitations for perchlorate will be reconsidered and appropriately revised based on subsequent operations data.

SCHEDULE OF COMPLIANCE:

The Permittee shall implement and comply with the provisions of the permit upon issuance, and the following schedule of compliance, after approval by the Administrator, including in said implementation and compliance, any additions or modifications the Administrator may make in approving the schedule of compliance.

- **Upon issuance of the permit,** the Permittee shall achieve compliance with all discharge limitations; and

- **Within 7 days of operating at 1,000 gpm,** the Permittee shall submit written correspondence memorializing the date of system operation at the 1,000 gpm, design flow rate.

PROPOSED DETERMINATION:

The Division has made the tentative determination to modify the permit as proposed, under the provisions prescribed, for a continued term due to expire on August 7, 2005. In accordance with Nevada Administrative Code 445A.232, this discharge is classified as a *Discharge from Remediation, Dewatering, other than a discharge to ground water from the dewatering of a mine, or from a Power Plant, A Manufacturing or Food Processing Facility or Any Other Commercial or Industrial Facility – 1,000,000 gallons or more but less than 2,000,000 gallons of process water daily*.

PROCEDURES FOR PUBLIC COMMENT:

Notice of the Division's intent to issue a permit authorizing the facility to discharge to ground water of the State of Nevada, subject to the conditions contained within the permit, is being sent to the **Las Vegas Review Journal** for publication. Notice is also mailed to interested persons on our mailing list. Anyone wishing to comment on the proposed permit can do so in writing for a period of 30 days following the date of the public notice, and must be postmarked, faxed, or e-mailed by 5:00 p.m. on **February 23, 2004**. The comment period can be extended at the discretion of the Administrator. A public hearing on the proposed determination can be requested by the Applicant, any affected state, any affected interstate agency, the Regional Administrator, or any interested agency, person, or group of persons. The request must be filed within the comment period and must indicate the interest of the person filing the request and the reason(s) why a hearing is warranted.

Any public hearing held by the Administrator will be conducted in the geographical area of the proposed discharge or any other area the Administrator determines to be appropriate. All public hearings will be conducted in accordance with NAC 445A.238. The final determination of the Administrator may be appealed to the State Environmental Commission pursuant to NRS 445A.605.

Prepared by: Tamara J. Pelham
January 21, 2003
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